

RESEARCH

Open Access



The influence of breastfeeding factors on the prevalence of back and neck pain: data from an online survey

Marzena Ratajczak^{1*} and Renata Górniewicz¹

Abstract

Background Sometimes during breastfeeding women adopt positions that may cause problems with musculoskeletal system, resulting in back pain. The aim of this study was to determine the prevalence of lower back, upper back and neck pain in breastfeeding women and how this may be related to the act of breastfeeding.

Methods An online survey within Poland was conducted among 395 breastfeeding women who were 1 to 48 months postpartum and were divided into two groups; “no back pain” and “back pain present”. The measurement tools used included an original questionnaire, the International Physical Activity Questionnaire (IPAQ), a Numerical Pain Rating Scale (0–10), and the Roland-Morris Disability Questionnaire. Pearson’s chi-squared tests, Mann-Whitney U tests, Student’s t-tests, and Kruskal-Wallis ANOVA tests were used to compare the groups.

Results It was found that 84% of breastfeeding mothers suffered from back pain at least once a month. Pain was experienced at least once a week in the cervical, thoracic and lumbosacral regions in 48%, 36%, and 66% of the women, respectively. A dysfunctional state was present in 27.6% of breastfeeding mothers who suffered from back pain. Mothers experiencing back pain spent significantly more time on single breastfeeding episodes ($p < 0.05$) and had an increased total time breastfeeding per day ($p < 0.01$) compared to mothers with no back pain. Neck pain was significantly less intense in mothers preferring to breastfeed in a lying position as compared to mothers preferring a sitting position in a chair or an armchair ($p < 0.05$).

Conclusions This survey of Polish breastfeeding mothers revealed a very high prevalence of lower back, upper back and neck pain. The amount of time spent on breastfeeding and the choice of body position for breastfeeding were important factors differentiating the prevalence and intensity of the pain. It is recommended that breastfeeding mothers do not extend the single-feeding time in the adopted position beyond the required time. It is of utmost importance to choose a breastfeeding position in which all parts of the mother’s body are supported. To prevent neck pain, lying and semi-lying positions with head support are recommended.

Keywords Breast feeding, Lower back pain, Upper back pain, Neck pain, Breastfeeding positions, Ergonomics

*Correspondence:

Marzena Ratajczak
mratajczak@awf.poznan.pl

¹Department of Medical Biology, Poznan University of Physical Education,
ul. Królowej Jadwigi 27/39, Poznan 61-701, Poland



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

Introduction

Mother's milk is the primary source of nutrition for infants. While more women in developed countries are deciding to breastfeed, the rates are still not at the desired level and usually deviate from the WHO recommendations [1]. In Poland, the latest statistical data from 2014 shows that 98% of women breastfeed their newborns in the first week of life. However, by the sixth week, only 46% of women still breastfeed their infants, and from the second to the sixth month of a child's life, this drops to 42% [2]. In many countries, especially those with higher incomes, this percentage is even lower. The benefits of breastfeeding for both child and mother have been documented in numerous studies [3]. However, there are some reasons why women give up breastfeeding before the infant is 6 months old.

Effective breastfeeding is dependent on arranging the mother and child in such a way that both sides feel comfortable in this activity. The main feeding positions are the cradle hold, the cross-cradle hold, the football hold, the laid-back position, and the side-lying position. Regardless of which breastfeeding position women use, it is important that it is comfortable and does not overload the musculoskeletal system. Sometimes during breastfeeding women adopt positions that may cause problems with this system, resulting in back pain, and even the mere act of sitting still for a long time may increase pain. If there are additional risk factors leading to ligament and muscle weakness, such as a sedentary lifestyle, muscle imbalance may also lead to back pain [4, 5].

The few studies that have examined the impact of breastfeeding positions on comfort or the occurrence of pain have not sufficiently determined whether the period of breastfeeding increases the risk of pain in the lower back, upper back, or in the neck [6–9]. Although it has not been conclusively shown that the act of breastfeeding itself increases the risk of back pain, it can be concluded that the long-term use of non-ergonomic postures and the occurrence of overloads on the joints, muscles, tendons and ligaments during pregnancy makes breastfeeding women sensitive to back pain and therefore requires monitoring of the condition of the musculoskeletal system [10]. The puerperium and early motherhood are a difficult period in a woman's life, when they take on a new role and are learning the associated skills. As a result, many activities of everyday life, such as breastfeeding an infant, are performed non-ergonomically. Currently, there are no scientific reports on the prevalence of back pain in breastfeeding women in Poland. Research on the general population from 2014 shows that 28.4% of Polish women experience lower back pain, and neck and upper back pain are experienced by 21% and 19% of women in Poland, respectively [11]. If the prevalence of pain in particular parts of the back is even greater in the

population of breastfeeding mothers (BMs), it should be assumed that this is one of the reasons for giving up breastfeeding older infants. Meanwhile, for public health, the elimination of all factors discouraging mothers from breastfeeding their infants is extremely important because breastfeeding has its unquestionable advantages for both mothers and children, affecting their long-term health and quality of life [3]. The study aims to determine the prevalence of lower back, upper back, and neck pain, and their intensities in breastfeeding women as well as the variables that affect them.

Methods

Study design

A self-reported online questionnaire was used to collect data. In order to obtain results from a general representative group of Polish women Internet users who were breastfeeding, the websites on which the questionnaire were made available were not thematically related to back pain. By the term "back pain", we mean back pain at any level of the spine, from the cervical region to the sacrum. The only inclusion criterion for the study was that the participants had to be currently breastfeeding a child. The questionnaires were collected from October 26, 2020 to January 15, 2021. The instructions for the questionnaire included information on the general purpose of the research, its authors, and the anonymous and voluntary nature of participation. After reading the instructions and agreeing to participate, the participants proceeded to fill out the questionnaire.

Participants

Responses were collected from 395 women who were breastfeeding at the time. Before the statistical analyses based on reported information, the participants were divided into two groups. The first group consisted of women who declared that they did not experience back pain (hereinafter referred to as the "no back pain" group) and the second group consisted of women who experienced back pain at least once a month (hereinafter referred to as "back pain present" group). 62 women were included in the no back pain group, while 333 women were included in the back pain present group. The mean age of the respondents was 30.33 years. Additionally, all patients suffering from lower back pain ($n=283$), upper back pain ($n=180$), and neck pain ($n=214$) were divided according to the preferred body position used for breastfeeding to examine differences in pain intensity.

Research tools

An original questionnaire was used, which contained questions on the following topics: (1) general information, such as age, place of residence, education, body height, body mass, number of breastfed children

throughout their lives and, for the most recent child, the type of delivery; (2) Breastfeeding, focusing on frequency and feeding positions; (3) physical activity; (4) back pain, focusing on frequency, intensity, and region of the back. The average feeding time per day was calculated according to the formula:

$$\frac{\text{min number of feedings per day} + \text{max number of feedings per day}}{2} \times \text{average time of a single feeding}$$

The physical activity assessment was conducted using the *International Physical Activity Questionnaire* (IPAQ) [12]. For the purposes of this study, a shorter version of the questionnaire consisting of 7 questions was used. The questions related to all types of physical activity, including activity associated with leisure time, work or household duties, and time spent in a sitting position. Only activities that lasted for at least 10 min continuously were used to calculate the physical activity levels. Maximal pain intensity in the week preceding the survey was measured for the three regions of the back using a *Numerical Pain Rating Scale*, where pain is rated from 0 to 10 and 0 means no pain at all, while 10 means the worst possible pain [13]. To assess functional state in the respondents with back pain the *Roland-Morris Disability Questionnaire* was used [14]. A value of 4 on this questionnaire was considered as the threshold for distinguishing functional and dysfunctional states [15].

Statistical analysis

The results were analysed using Statistica software (Tibco Software Inc.) For qualitative variables, multi-way tables were constructed and the Pearson's chi-squared test was used. In the case of quantitative variables, normality was

first verified using the Shapiro-Wilk test. The differences in mean values between the no back pain and back pain present groups were assessed using the non-parametric Mann-Whitney U test for variables with a non-normal distribution and heterogeneous variances, while for variables with a normal distribution and homogeneous variances, the Student's t-test was used. The Kruskal-Wallis ANOVA test was used to assess the differences in pain intensity between women preferring certain body positions for breastfeeding. A value of $p < 0.05$ was assumed for the significance level. The results are presented as means and standard deviations (\pm SD).

Results

Responses were collected from 395 women who were breastfeeding at the time of the study. Due to missing data, statistical analysis was only carried out 62 breastfeeding women who did not have back pain (not once in the month preceding the survey; no back pain group) and 325 women with back problems (at least once in the last month; back pain present group).

Table 1 provides information on the sociodemographic characteristics of the BMs. The mean age of the surveyed women was 29.5 years in the no back pain group and 30.5 years in the back pain present group. There was no significant difference in this respect between the studied women. Similarly, no between-group differences were found for body mass index (BMI), university graduation, level of physical activity, time spent sitting during the day, and type of delivery. Over 72% of women from the no back pain group and over 79% of women from the back pain present group graduated from university. Physiological delivery was experienced by 67.74% of the women with back pain and 65.74% of the women without pain.

At least 84% of women experienced back pain once a month. The percentage distribution of the BMs with and without pain in a particular back area at least once a week is presented in the Fig. 1. Pain in the cervical, thoracic and lumbosacral areas was experienced by 48%, 36% and 66% of the surveyed women, respectively.

As outlined above, the level of functioning was assessed using the *Roland-Morris Disability Questionnaire* and a score of >4 was used to distinguish a state of dysfunction in people with lower back pain [15]. More than a quarter of BMs with back pain scored ≥ 4 on the Roland-Morris questionnaire.

Variables related to breastfeeding in women with or without back pain are presented in Table 2. A significant between-group difference was found for the average time spent breastfeeding. Women with back pain spent significantly more time feeding during the day ($p < 0.01$) and in single feeding sessions ($p < 0.05$) than women who did not have lower back, upper back and/or neck pain. More than 67% of the women fed their child

Table 1 General maternal characteristics — comparing women with back pain to those without back pain

| | No back pain (N=62) | Back pain present (N=325) | p |
|--|------------------------|---------------------------------|----------|
| Age [years] | 29.5 ± 4.9 | 30.5 ± 4.1 | 0.0694* |
| Body mass index [kg/ m ²] | 23.2 ± 4.0 | 23.9 ± 4.2 | 0.1771* |
| Education | | | |
| University degree | 45 (72.58%) | 259 (79.69%) | 0.2112** |
| No University degree | 17 (27.42%) | 66 (20.31%) | |
| Physical Activity [MET-min/week] | 1736.7 ± 1379.1 | 1921.1 ± 1928.8 | 0.9402* |
| Time spent sedentary [min/day] | 200.35 ± 131.64 | 238.04 ± 277.30 | 0.5293* |
| Delivery | | | |
| Physiological delivery | 42 (67.74%) | 213 (65.74%) | 0.7604** |
| Cesarean section or complications | 20 (32.26%) | 111 (34.26%) | |

*U-Mann-Whitney test, ** chi-squared test

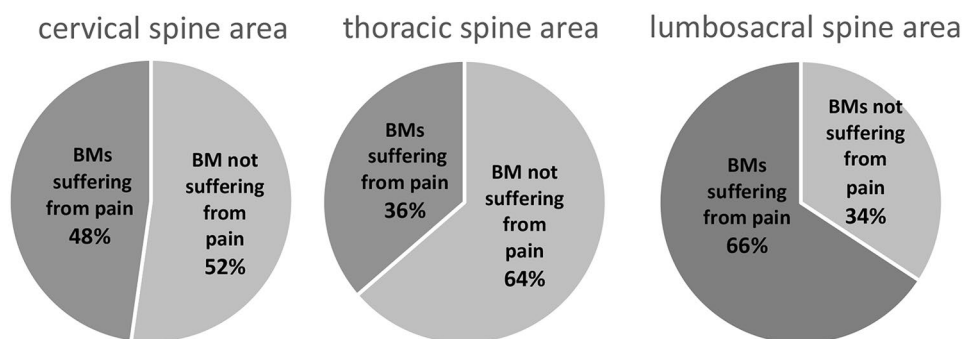


Fig. 1 Percentage distribution of respondents with and without back pain in particular back/spine areas. BMs = breastfeeding mothers

partially by breast and partially by bottle, or with other meals. For mothers from both groups, the most common (more than 48% of respondents) mode and body position during breastfeeding was the seated position using furniture not intended for sitting (e.g., edge of the bed). A lying position was chosen as most common by 40% of the women without pain and by 38% of women with pain. Sitting using furniture intended for sitting was the least frequent body position while breastfeeding among women with back pain and those without back pain (11% and 13%, respectively). Among the breastfeeding techniques, the highest percentage of women often or always used the cradle hold or side-lying position (54% for both groups and both positions). The cross-cradle and football holds were used rarely or not at all. For 75.81% of mothers with no back pain and 64% of mothers with back pain present, a nursing pillow was used rarely or not at all. Most of the respondents (more than 65%) did not use a lactation consultant, and only 27.42% of BMs not suffering from back pain and 20.62% of BMs suffering from back pain received practical recommendations from a midwife about preventing back pain while breastfeeding. There were no statistically significant between-group differences in terms of the age of the breastfed child, the number of breastfed babies across the lifetime, feeding patterns, position of the body during breastfeeding, frequency of using particular breastfeeding positions or a nursing pillow, or receiving support from a private lactation consultant or midwife.

Figure 2 shows the amount of time spent on breastfeeding by mothers with and without back pain.

The maximal pain intensity was examined separately for the lower back, upper back, and the neck. The highest mean pain intensities were recorded in the lower back, while the symptoms in the cervical region were the least bothersome (Fig. 3). After dividing women who suffer from pain in particular region of the spine into groups according to the preferred body positions during breastfeeding, it was found that women who breastfeed their children in a sitting position using a bed or couch ($p < 0.05$) and women who breastfeed their children in a

lying position ($p < 0.01$) experienced significantly lower maximal neck pain than women who breastfed their children in a sitting position using a chair or an armchair (Fig. 4). No such relations were observed in pain intensities in mothers with upper and lower back pain.

Discussion

Different life situations, such as pregnancy, may increase the risk of back pain [16]. In this study, we examined whether breastfeeding a child may also be related to back pain symptoms.

A nursing woman may experience lingering discomfort resulting from her pregnancy. During pregnancy, the body's centre of gravity shifts due to changes in body weight and the development of the foetus. As a result, body posture, curvature of the spine, and the related biomechanics of the spine also change. For example, the ligaments relax and the spine becomes overloaded, making it less stable. These alterations can lead to back pain, which is reported by more than 50% of pregnant women [17]. It seems, however, that in the postpartum period, the symptoms may continue or even worsen. A study conducted in Islamabad found that 74% of women who breastfed experienced musculoskeletal pain in various parts of the body [7]. Pain is most likely to occur in the first months after giving birth when women are recovering from what is often a difficult period of pregnancy, as well as from the delivery. In addition to the pain that occurred before the birth, completely new onset of pain may appear [18].

In the current study, 84% of BMs suffered from lower back, upper back, and/or neck pain at least once in a month. More than 66% of the respondents reported pain in the lumbar region at least once in a week (Fig. 1). Comparing these percentages with studies examining similar ailments during pregnancy, it can be concluded that back pain prevalence in BMs is very high and likely one of the reasons for low breastfeeding rates. The significance of the problem is highlighted by the finding that more than a quarter of breastfeeding women with back pain exhibit a dysfunctional state due to pain in the lumbar region.

Table 2 Breastfeeding-related variables — comparing women with back pain to those without back pain

| | No back pain (N = 62) | Back pain present (N = 325) | p |
|---|--------------------------|-----------------------------|----------|
| The age of the breastfed child [months] | 9.89 ± 7.93 | 9.18 ± 7.53 | 0.3768* |
| Average time of a single feeding [min] | 10.58 ± 7.44 | 12.12 ± 7.99 | 0.0497* |
| Time spent breastfeeding per day [min/day] | 68.19 ± 64.45 | 91.92 ± 83.06 | 0.0096* |
| The number of breastfed babies in the lifetime | | | |
| 1 | 45 (72.58%) | 196 (60.31%) | 0.0674** |
| 2 | 16 (25.81%) | 106 (32.62%) | |
| 3 or more | 1 (1.61%) | 23 (7.08%) | |
| Feeding pattern | | | |
| Exclusive breastfeeding | 19 (30.65%) | 107 (32.92%) | 0.7258** |
| Partial breastfeeding | 43 (69.35%) | 218 (67.08%) | |
| The most common mode and position of the body during breastfeeding | | | |
| Sitting position using chair or armchair | 7 (11.29%) | 43 (13.23%) | 0.9033** |
| Sitting position using bed or couch | 30 (48.39%) | 157 (48.31%) | |
| Lying position | 25 (40.32%) | 125 (38.46%) | |
| Breastfeeding positions | | | |
| Cradle hold | | | 0.1562** |
| Often or always | 34 (54.84%) | 205 (63.08%) | |
| Sometimes | 9 (14.52%) | 56 (17.23%) | |
| Rarely or never | 19 (30.65%) | 64 (19.69%) | |
| Cross-cradle hold | | | 0.9221** |
| Often or always | 4 (6.45%) | 23 (7.08%) | |
| Sometimes | 4 (6.45%) | 25 (7.69%) | |
| Rarely or never | 54 (87.1%) | 277 (85.23%) | |
| Football hold | | | 0.7269** |
| Often or always | 3 (4.84%) | 15 (4.62%) | |
| Sometimes | 2 (3.23%) | 18 (5.54%) | |
| Rarely or never | 57 (91.94%) | 292 (89.85%) | |
| Laid-back | | | 0.4192** |
| Often or always | 11 (17.74%) | 50 (15.38%) | |
| Sometimes | 4 (6.45%) | 38 (11.69%) | |
| Rarely or never | 47 (75.81%) | 237 (72.92%) | |
| Side-lying | | | 0.3198** |
| Often or always | 38 (61.29%) | 194 (59.69%) | |
| Sometimes | 7 (11.29%) | 60 (18.46%) | |
| Rarely or never | 17 (27.42%) | 71 (21.85%) | |
| The use of a nursing pillow | | | |
| Often or always | 11 (17.74%) | 80 (24.62%) | 0.1702** |
| Sometimes | 4 (6.45%) | 37 (11.38%) | |
| Rarely or never | 47 (75.81%) | 208 (64.00%) | |
| Counseling a private lactation consultant | | | |
| Yes | 19 (30.65%) | 112 (34.46%) | 0.5606** |
| No | 43 (69.35%) | 213 (65.54%) | |
| Receiving information from a midwife about preventing back pain while breastfeeding | | | |
| Practical recommendations or instruction | 17 (27.42%) | 67 (20.62%) | 0.1711** |
| Minor recommendations | 13 (20.97%) | 105 (32.31%) | |
| No advice | 32 (51.61%) | 153 (47.08%) | |

*U-Mann-Whitney test, ** chi-squared test

On the Roland-Morris questionnaire, the respondents most often reported that they frequently changed body position due to the back pain, lay down more often than usual to rest, experienced back pain most of the time, and were more irritable than usual. These findings indicate that BMs often suffer from a possibly temporary

health problem but one that may discourage them from breastfeeding.

A probable cause of back and neck pain during breastfeeding, in addition to muscle weakness after pregnancy, is the adoption of non-ergonomic positions during feeding. Non-ergonomic positions may consequently

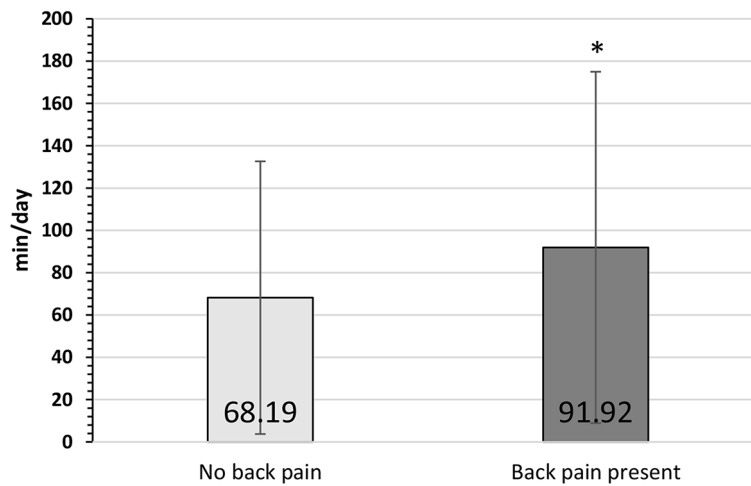


Fig. 2 Mean time spent breastfeeding per day in mothers with and without back pain. * the mean feeding time per day was significantly longer in the group of women suffering from back pain ($p < 0.01$)

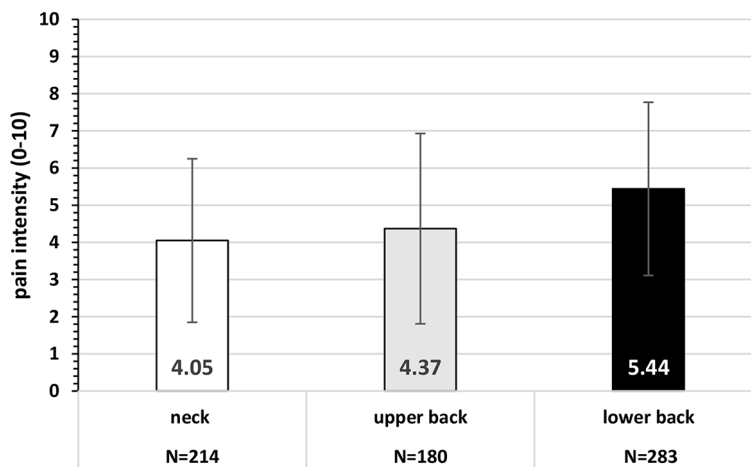


Fig. 3 The maximal intensity of pain in the neck, upper back and lower back in the week before the survey

overload parts of the body, especially if the breastfeeding lasts for many months or if the mother has breastfed many children. Just sitting in an inclined position places a load on the intervertebral discs that is much more than that experienced when lying, standing, or sitting in a relaxed position with a backrest [19]. In this study, no differences were found between BMs in terms of the time spent sedentary (Table 1). Therefore, the quality of sitting may be more important, including such things as whether the BM supports the child in her arms, if the infant is brought closer to the mother by a pillow, whether the mother is bending over the child, or how long is she assumes non-ergonomic positions. Nursing mothers often sit almost without moving, lean over the baby during breastfeeding instead of bringing the baby closer to them, and do not use pillows to facilitate the act of feeding and relieve the muscles [7]. In the current study, no differences were found between BMs with or without back pain in the use of a nursing pillow or the

position of the body during breastfeeding. However, in both groups of women, a number of unfavourable variables were noted. Namely, the majority of women fed their children while sitting on furniture unsuitable for prolonged sitting, such as a bed or sofa, and never or rarely used a nursing pillow (Table 2). Sitting on a bed with no support for the lower back may overstress the musculature of the trunk muscles, while holding the child in the arms may strain the spine. Thus, it can be assumed that the positions used for breastfeeding in the majority of respondents were not ergonomic.

According to the recommendations, breastfeeding should take place in a comfortable position for the body, regardless of the selected breastfeeding position. It is important that the woman does not experience pain during breastfeeding, does not strain the neck muscles, has relaxed shoulders, has all parts of the body supported, and that the position taken ensures effective milk transfer [20]. There were no differences between BMs with and

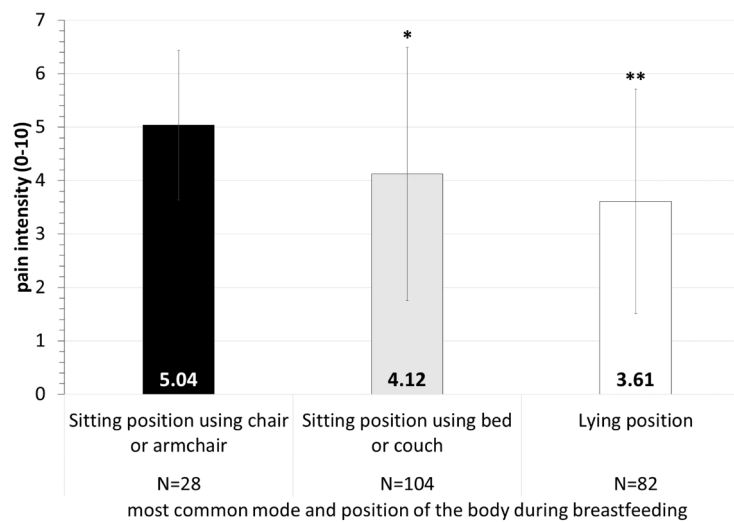


Fig. 4 The maximal intensity of pain in the neck region in the week before the survey depending on the position used during breastfeeding. A significant difference in pain intensity in the neck was found between BMs who preferred to lie down while breastfeeding (** $p < 0.01$) or BMs who preferred sitting on a bed or couch (* $p < 0.05$) and BMs who preferred sitting on a chair or an armchair while breastfeeding

without back pain in terms of the breastfeeding positions utilized. Rani et al. [7] also reported no direct relationship between breastfeeding position and the prevalence of back pain. However, these authors associated frequent use of the cross-cradle hold, especially when used incorrectly, with mechanical neck pain. The sitting position puts an increased strain on the muscles of the back of the neck and upper back, while the muscles of the front of the neck and shoulders are in a shortened position, causing them to lose flexibility over time [21].

Therefore, the sitting position, especially when unsupported, can cause neck pain. We found a significantly higher intensity of neck pain in BMs nursing in a chair or armchair compared to BMs nursing in a sofa or bed or in a supine position (Fig. 4). The majority of women in this study breastfed on a couch or bed, which could turn out to be better for the neck pain prevention than breastfeeding in a possibly unnatural upright position in a chair or armchair. The reason for the higher intensity of neck pain in women used to feeding while sitting may be the reflex of tilting the head over the baby and the lack of support for the arms when holding the baby. Perhaps the positions on a couch or bed are closer to a semi-reclining position, providing support and a greater comfort. Also the supine position, on the other hand, may be more advantageous for the prevention of back and neck pain as it reduces the burden on the mother's muscles to a minimum, especially if used correctly. In the laid-back position, a woman should have a high pillow under her head and torso to prevent the reflex to raise her head to look at the baby. Lying on her side, the woman rests her head on a pillow or on her forearm. If the feedings are long, it is recommended to place a pillow between the mother's

knees and behind her back to stabilize her back and pelvis [9].

In recent years, researchers have investigated which breastfeeding positions are the least likely to result in back pain problems for women. For example, an experimental study carried out on 25 women showed that the football hold with the use of pillows puts less strain on the erector spinae and external oblique muscles than the cradle or cross-cradle hold with the use of pillows [6]. However, the latest meta-analysis comparing the comfort of the laid-back breastfeeding position with other traditional breastfeeding positions did not find significant differences between the positions [22]. Other authors believe that, due to differences in body build and posture, it is impossible to choose one position that will suit all women. In addition, positions over time may evolve and change to meet the needs of the mother and the growing infant [20]. One good recommendation for preventing musculoskeletal injuries may be to alternate feeding positions and sides (right, left) to avoid overloading any one part of the body [6], as repeated use of the same body position can cause a muscle imbalance. In different people, selected positions may exacerbate an existing musculoskeletal problem, while, for others, the problems may be alleviated by the same positions. Pain caused by inappropriate posture during breastfeeding can occur anywhere in the body, both during and after breastfeeding [7]. Being in an incorrect position for a long time, as can occur during breastfeeding, may stress the periarticular structures and cause mechanical deformation of the soft tissues [23]. If the use of the wrong posture is not corrected, problems in the musculoskeletal system may perpetuate, as is the case for curvature of the spine [24].

In this study, a significant difference was noted between BMs suffering from pain and those without back pain in terms of the length of time spent on feeding per day and on individual feeding sessions. As far as we know, other studies examining the occurrence of back pain during breastfeeding have not taken this factor into account. It has been previously confirmed that a longer duration of sitting is a risk factor for lower back pain [25]. If the positions assumed for breastfeeding by the respondents were additionally non-ergonomic, the influence of the increased time spent in these positions on the appearance of pain in muscles and joints seems understandable. The frequency and length of a breastfeeding episode depends on several factors, including the infant's age and the amount of solid food he or she eats. According to previous studies, the length of an individual breastfeeding episode typically lasts from 10 to 19 min, regardless of the age of the child [26]. Even in newborns, the suckling duration closes in at 30 min [27]. Although the average time of a single feeding was relatively low for the current respondents, the maximum duration of a feeding session in women without back pain was 40 min, and in women with back pain present it was 60 min, which exceeds the common advice to feed 10–15 min each side per feeding. Such a long feeding time may indicate a lack of knowledge and skills in some mothers regarding breastfeeding their children. It is possible that Polish women do not receive sufficient support from medical staff. About half of the respondents did not receive any advice from a midwife regarding the prevention of back pain. In addition, almost 70% of women from the group suffering from back pain did not receive advice from a private lactation consultant who could fill the gaps in knowledge and skills.

The amount of time spent on feeding turned out to be the only variable differentiating women with and without back pain in the current study. In other studies, no relationship between back pain and breastfeeding related variables was found [7], or few variables differentiated BMs who had musculoskeletal pain (including back and neck pain) from women without pain. An association has been observed between the lifetime and present prevalence of musculoskeletal pain and parity. Primiparous respondents report a higher prevalence of musculoskeletal pain than multiparous women, which may indicate a significant influence of previous experience with breastfeeding. The second variable identified was the age of the breastfeeding respondents, which differentiated BMs with ongoing musculoskeletal pain and those without pain. A greater percentage of younger women (<30 years) than older women (>30 years) experienced the pain [23]. Therefore, it can be concluded that young mothers (<20 years old) and primiparous women need more support

and guidance on appropriate breastfeeding techniques [23, 28].

A study examining the persistence of back pain 2 years after pregnancy showed that weight gain compared with the pre-pregnant period and weight loss compared with postpartum period were important factors differentiating women with back pain from those without back pain. In women without pain, weight loss was higher and weight gain during pregnancy was lower than in women suffering from back pain [29]. A high BMI may influence the development of degenerative changes in the spine, and therefore the perception of pain [30, 31]. Although the current study did not find a significant difference in BMI between women with and without back pain, we recognize that body weight is a variable that should be carefully considered. However, it is possible that at this stage in the development of back pain, and in this period of a woman's life, it may not be the most important variable.

Although the precise relationship between physical activity levels and back pain is unclear [32], some studies have found that proper exercise can increase muscle strength and lead to a reduction in back pain [33]. In the current study, BMs with and without back pain did not differ in terms of the level of physical activity. It has also been found that leisure time physical activity may be more protective against lower back pain than total physical activity [34]. This conclusion also points to some limitations of this study and indications for further studies. Firstly, in subsequent studies, the impact of leisurely physical activity should be separated from occupational activity and that related to household chores. Secondly, future research should be undertaken to identify factors more distant in the past that may have a significant impact on the occurrence of pain, such as occupational factors. Lastly, the survey method always involves a certain risk of misinterpretation because it is based on self-reporting and limits the response. For example, the choice of sitting position on a chair does not rule out that a particular respondent used objects to support her body. In the future, observational methods should be used with the supervision of medical personnel who will precisely qualify the position of the breastfeeding woman. Longitudinal studies to observe the nature and intensity of pain during the entire period of breastfeeding should also be considered.

Conclusions

Back pain associated with breastfeeding is common and can make it difficult for mothers to reach their breastfeeding goals. The factor that directly connects back pain with the act of breastfeeding is the amount of time spent on breastfeeding per day. It is recommended that breastfeeding mothers do not extend the

time of the breastfeeding beyond the moment when the infant actually consumes milk or change body positions during a single session if the child is suckling slowly. The most probable cause of additional neck, upper back and lower back pain in breastfeeding women is the use of non-ergonomic breastfeeding positions. The choice of body position for breastfeeding turned out to be an important factor differentiating the intensity of neck pain in breastfeeding mothers. Neck pain is the least intense in women who breastfed their children in the supine position. For the lower back and upper back regions, such differences in pain intensity were not found. To prevent neck pain, lying and semi-lying positions with head support are recommended. It is of utmost importance to choose a breastfeeding position in which all parts of the mother's body are supported. This study raises an important aspect for researchers and policy makers seeking to improve the level of breastfeeding to consider. For community midwives, the results suggest that teaching back pain prevention techniques should be implemented as part of the overall care of the mother.

Acknowledgements

Not applicable.

Author contributions

M.R. conceptualized the study, interpreted results, drafted and edited the manuscript. R.G. contributed to survey dissemination and analyzed the results. All authors read and approved the final manuscript.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical approval and consent to participate

The study adhered to the standards laid down in the Declaration of Helsinki and has undergone review by the Bioethics Committee of the Medical University in Poznan. The Committee considered that this study did not require special ethical approval. All respondents agreed to participate in the study and informed consent was obtained from all subjects.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Conflict of interest

Not applicable.

Received: 17 June 2023 / Accepted: 15 August 2024

Published online: 29 August 2024

References

1. Bagci Bosi AT, Eriksen KG, Sobko T, Wijnhoven TMA, Breda J. Breastfeeding practices and policies in WHO European Region Member States. *Public Health Nutr.* 2016;19(4):753–64.
2. Nehring-Gugulska M, Szyber B. Raport o stanie karmienia piersią w Polsce 2014; 2014.
3. Victora CG, Bahl R, Barros AJ, França GV, Horton S, Krasevec J, et al. Breastfeeding in the 21st century: epidemiology, mechanisms, and lifelong effect. *Lancet.* 2016;387(10017):475–90.
4. Massie DL. Influence of lower extremity biomechanics and muscle imbalances on the lumbar spine. *Athletic Therapy Today.* 1999;4(2):46–51.
5. Orr LC, George SZ, Simon CB. Association between physical activity and pain processing in adults with chronic low back pain compared to pain-free controls. *J Back Musculoskelet Rehabilitation.* 2017;30(3):575–81.
6. Ezeukwu OA, Ojukwu CP, Okemuo AJ, Anih CF, Ikele IT, Chukwu SC. Biomechanical analysis of the three recommended breastfeeding positions. *Work.* 2020;66(1):183–91.
7. Rani S, Habiba UE, Qazi WA, Tassadaq N. Association of breast feeding positioning with musculoskeletal pain in post partum mothers of Rawalpindi and Islamabad. *J Pak Med Assoc.* 2019;69(4):564–6.
8. Cooklin AR, Amir LH, Nguyen CD, Buck ML, Cullinane M, Fisher JRW, et al. Physical health, breastfeeding problems and maternal mood in the early postpartum: a prospective cohort study. *Arch Womens Ment Health.* 2018;21(3):365–74.
9. Afshariani R, Kiani M, Zamanian Z. The influence of ergonomic breastfeeding training on some health parameters in infants and mothers: a randomized controlled trial. *Archives Public Health.* 2019;77(1):47.
10. Bellù R, Condò M. Breastfeeding promotion: evidence and problems. *Pediatr Med Chir.* 2017;39(2):156.
11. Piekarczywska M, Zajenkowska-Kozłowska A, Zdrowia. WS, Życia. DBSiW. Zdrowie i zachowanie zdrowotne mieszkańców Polski w świetle Europejskiego Ankietowego Badania Zdrowia (EHIS) 2014 r. Główny Urząd Statystyczny; 2015.
12. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003;35(8):1381–95.
13. Childs JD, Piva SR, Fritz JM. Responsiveness of the numeric pain rating scale in patients with low back pain. *Spine.* 2005;30(11).
14. Roland M, Fairbank J. The Roland-Morris disability questionnaire and the Oswestry disability questionnaire. *Spine (Phila Pa 1976).* 2000;25(24):3115–24.
15. Stratford PW, Riddle DL. A Roland Morris disability questionnaire target value to distinguish between functional and dysfunctional states in people with low back pain. *Physiotherapy Can Physiotherapie Can.* 2016;68(1):29–35.
16. Close C, Sinclair M, Liddle D, Mc Cullough J, Hughes C. Women's experience of low back and/or pelvic pain (LBPP) during pregnancy. *Midwifery.* 2016;37:1–8.
17. Liddle SD, Pennick V. Interventions for preventing and treating low-back and pelvic pain during pregnancy. *Cochrane Database Syst Reviews.* 2015(9).
18. Sipko T, Grygier D, Barczyk K, Elias G. The occurrence of strain symptoms in the lumbosacral region and pelvis during pregnancy and after childbirth. *J Manipulative Physiol Ther.* 2010;33(5):370–7.
19. Wilke HJ, Neef P, Caimi M, Hoogland T, Claes LE. New in vivo measurements of pressures in the intervertebral disc in daily life. *Spine.* 1999;24(8):755–62.
20. Colson S. Maternal breastfeeding positions: have we got it right? (2). *Pract Midwife.* 2005;8(11):29–32.
21. Jeffcoat H. Help for postural pain after breastfeeding. *Int J Childbirth Educ.* 2009;24(1):30–1.
22. Wang Z, Liu Q, Min L, Mao X. The effectiveness of the laid-back position on lactation-related nipple problems and comfort: a meta-analysis. *BMC Pregnancy Childbirth.* 2021;21(1):248.
23. Mbada CE, Oyinola FC, Olatunbosun TO, Awotidebe TO, Arije OO, Johnson OE et al. Is baby-friendly breastfeeding mother-friendly? *J Women's Health Phys Therapy.* 2013;37(1).
24. Bonet M, Kaminski M, Blondel B. Differential trends in breastfeeding according to maternal and hospital characteristics: results from the French national perinatal surveys. *Acta Paediatr.* 2007;96(9):1290–5.
25. Park S-M, Kim H-J, Jeong H, Kim H, Chang B-S, Lee C-K, et al. Longer sitting time and low physical activity are closely associated with chronic low back pain in population over 50 years of age: a cross-sectional study using the sixth Korea National health and nutrition examination survey. *Spine J.* 2018;18(11):2051–8.

26. Shealy KR, Scanlon KS, Labiner-Wolfe J, Fein SB, Grummer-Strawn LM. Characteristics of breastfeeding practices among US mothers. *Pediatrics*. 2008;122(Supplement 2):S50.
27. Howie PW, Houston MJ, Cook A, Smart L, McArdle T, McNeilly AS. How long should a breast feed last? *Early Hum Dev*. 1981;5(1):71–7.
28. Goyal RC, Banginwar AS, Ziyu F, Toweir AA. Breastfeeding practices: positioning, attachment (latch-on) and effective suckling - a hospital-based study in Libya. *J Fam Commun Med*. 2011;18(2):74–9.
29. To WW, Wong MW. Factors associated with back pain symptoms in pregnancy and the persistence of pain 2 years after pregnancy. *Acta Obstet Gynecol Scand*. 2003;82(12):1086–91.
30. Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: a meta-analysis. *Am J Epidemiol*. 2010;171(2):135–54.
31. Liuke M, Solovieva S, Lamminen A, Luoma K, Leino-Arjas P, Luukkonen R, et al. Disc degeneration of the lumbar spine in relation to overweight. *Int J Obes (Lond)*. 2005;29(8):903–8.
32. Sitthipornvorakul E, Janwantanakul P, Purepong N, Pensri P, van der Beek AJ. The association between physical activity and neck and low back pain: a systematic review. *Eur Spine J*. 2011;20(5):677–89.
33. Soungkyun H, Gyuchang LEE. Effects of a low back exercise program on low back pain patients' lumbar lordotic angle, abdominal muscle power, and pain. *J Hum Sport Exerc*. 2021;16(2):456–62.
34. Amorim B, Simic A, Pappas M, Zadro E, Carrillo JR, Ordoñana E. Is occupational or leisure physical activity associated with low back pain? Insights from a cross-sectional study of 1059 participants. *Braz J Phys Ther*. 2019;23(3):257–65.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.